

## DEVELOPMENT AND MODAL ANALYSIS OF BIOINSPIRED CNT/EPOXY NANOCOMPOSITE MAV FLAPPING WINGS

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### Abstract

*The aim of the present work is the development and modal analysis of hummingbird inspired MAV flapping wings. Carbon nanotubes (CNTs)/epoxy nanocomposite is chosen as the material for wing fabrication. The nanocomposite has been developed and characterized using dynamic mechanical analyzer for its dynamic viscoelastic properties. Wing designing is done by obtaining the data points from 2D full-flexed giant hummingbird wing image using digitizer. The fabrication of wings is done using molding manufacturing technique. Wing mold is made out of Perspex sheet using laser engraving machine. Modal analysis has been performed in air/normal environment and vacuum chamber. The results are used for determining the repeatability of wing manufacturing technique, too. A 3D model of wing is used for computational modal analysis using commercial finite element software ANSYS. The results from experiments and ANSYS simulations are compared and found in good agreement with each other.*

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